

## CLAIMS

1. A method of processing meat by:
  - positioning a meat product within an interior volume of a decompression chamber;
  - creating a pressure differential across a gas output in communication with said interior
  - 5 volume of said decompression chamber; and
  - rapidly decompressing said decompression chamber by transferring gas from said interior
  - volume of said decompression chamber through said gas output, wherein said pressure
  - differential and a rate of said rapid decompression are selected to be suitable for processing said
  - meat product positioned within said interior volume of said decompression chamber.
- 10 2. A method of processing meat as claimed in claim 1 wherein said pressure differential and said
- rate of rapid decompression are selected to be suitable for tenderizing said meat product.
3. A method of processing meat as claimed in claim 1 wherein said pressure differential and said
- 15 rate of rapid decompression are selected to be suitable for killing microorganisms in said meat
- product.
4. A method of processing meat as claimed in claim 1 wherein said pressure differential is at
- least about 100 kPa.
- 20 5. A method of processing meat as claimed in claim 1 wherein said rate of rapid decompression
- exceeds about 10 MPa/sec.
6. A method of processing meat as claimed in claim 1 wherein said rate of rapid decompression
- 25 is between about 10 MPa/sec and about 350 MPa/sec.
7. A method of processing meat as claimed in claim 1 wherein said meat is further processed by
- recreating said pressure differential following said rapid decompression and repeating said rapid
- decompression.
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8. A method of processing meat as claimed in claim 1 wherein said pressure differential is created by introducing compressed gas into said interior volume of said decompression chamber.

9. A method of processing meat as claimed in claim 1 wherein said pressure differential is created by maintaining said interior volume of said decompression chamber near atmospheric pressure and placing said gas output in communication with a vacuum chamber below atmospheric pressure.

10. A method of processing meat as claimed in claim 1 wherein said decompression chamber is rapidly decompressed by elevating said pressure differential beyond a bursting limit of a rupture disc extending across said gas output.

11. A method of processing meat as claimed in claim 1 wherein said decompression chamber is rapidly decompressed by actuating a valve extending across said gas output.

12. A method of processing meat as claimed in claim 1 wherein said pressure differential is created by filling said interior volume of said decompression chamber with a spoilage inhibiting gas having a composition selected to inhibit growth of bacteria in said meat product.

13. A method of processing meat as claimed in claim 12 wherein the amount of carbon dioxide present in said spoilage inhibiting gas significantly exceeds the amount of carbon dioxide present in air.

14. A method of processing meat as claimed in claim 12 wherein said spoilage inhibiting gas consists essentially of substantially pure carbon dioxide.

15. A method of processing meat as claimed in claim 1 wherein said pressure differential is created by filling said interior volume of said decompression chamber with a oxygenating gas having a composition selected to enhance the color of said meat product.

16. A method of processing meat as claimed in claim 15 wherein the amount of oxygen present in said oxygenating gas significantly exceeds the amount of oxygen present in air.

17. A method of processing meat as claimed in claim 16 wherein said oxygenating gas consists essentially of substantially pure oxygen.

18. A method of processing meat by:

positioning a meat product within an interior volume of a decompression chamber;  
pressurizing said interior volume of said decompression chamber; and  
rapidly decompressing said decompression chamber, wherein said rate of said rapid decompression defines a magnitude suitable for processing said meat product positioned within said interior volume of said decompression chamber.

19. A meat processing apparatus comprising:

a decompression chamber defining an interior volume, wherein said decompression chamber is configured to permit a meat product of substantial size to be placed within and removed from said interior volume;

a gas output in communication with said interior volume of said decompression chamber;  
and

a decompression valve arranged along said compressed gas output and configured to:

enable creation of a pressure differential across said decompression valve with a relatively positive pressure within said interior volume of said decompression chamber, and

enable rapid decompression of said decompression chamber through transfer of gas from said interior volume of said decompression chamber through said decompression valve, wherein said pressure differential and a rate of said rapid decompression define magnitudes suitable for processing a meat product positioned within said interior volume of said decompression chamber.

20. A meat processing apparatus as claimed in claim 19 wherein said meat processing apparatus further comprises:

5 a gas input in communication with said interior volume of said decompression chamber;  
and

a gas input valve arranged along said gas input and configured to permit controlled introduction of gas into said interior volume of said decompression chamber and to inhibit release of gas from said decompression chamber.

10 21. A meat processing apparatus as claimed in claim 19 wherein said decompression chamber is constructed of a material that allows cleaning and sterilizing in accordance with meat packing industry sanitary practices.

15 22. A meat processing apparatus as claimed in claim 19 further comprising a load/unload port in communication with said decompression chamber and configured to permit loading and unloading of said meat product.

20 23. A meat processing apparatus as claimed in claim 19 further comprising a controller programmed to monitor and control the pressurization and decompression of the decompression chamber.